Claims

1. (Currently Amended) A thermoelectric power source comprising:

a flexible substrate having an upper surface; and

a thermoelectric couple comprising:

(a) a sputter deposited thin film p-type thermoelement positioned on the upper surface of the flexible substrate;

(b) a sputter deposited thin film n-type thermoelement positioned on the upper surface of the flexible substrate adjacent the p-type thermoelement; and

(c) an electrically conductive member positioned on the flexible substrate, and electrically connecting the first end of the p-type thermoelement with the second end of the n-type thermoelement, wherein the p-type or the n-type thermoelements comprise Bi_xTe_y, Sb_xTe_y, or Bi_xSe_y wherein x is about 2 and y is about 3.

2. (Original) The thermoelectric power source of claim 1 wherein the p-type or the n-type thermoelements have L/A ratios greater than about 20 cm^{-1}.

3. (Original) The thermoelectric power source of claim 1 wherein the p-type or the n-type thermoelements have L/A ratios greater than about 100 cm^{-1}.

4. (Canceled)

5. (Currently Amended) The thermoelectric power source of claim 1 wherein the p-type or the n-type thermoelements comprise Bi_xTe_y ~~are selected from the group Bi_xTe_y, Sb_xTe_y, and Bi_xSe_y alloys~~ where x is about 2 and y is about 3.

6. (Currently Amended) The thermoelectric power source of claim 1 further comprising at least about 50 thermoelectric couples, wherein the thermoelectric power source has a power output of at least about 1 μW with a voltage of ~~at least~~ at least about 0.25 volt.

7. (Original) The thermoelectric power source of claim 6 wherein the p-type or the n-type thermoelements are at least about 1 mm in length and at least about 0.1 mm in width.

8. (Original) The thermoelectric power source of claim 6 wherein the p-type or the n-type thermoelements are at least about 20 angstroms in thickness.

9. (Original) The thermoelectric power source of claim 1 further comprising at least about 1000 thermoelectric couples, wherein the thermoelectric power source has a power output of about 1W with a voltage of at least about 1 volt.

10. (Currently Amended) The thermoelectric power source of claim 1 wherein the p-type thermoelements each have a first width, the n-type thermoelements each have a second width, and the first width is different from the second width. ~~have different widths as compared to the n-type thermoelements.~~

11. (Original) The thermoelectric power source of claim 1 wherein two or more p-type thermoelements are positioned and electrically connected in parallel with one another and the parallel positioned p-type thermoelements are electrically connected in series to n-type thermoelements.

12. (Currently Amended) The thermoelectric power source of claim 1 ~~further including multiple thermoelectric couples electrically connected in series on the upper surface of the flexible substrate and~~ wherein the flexible substrate is in a coil configuration.

13. (Original) The thermoelectric power source of claim 1 wherein the volume of the thermoelectric power source is less than about 10 cm^3 and has a power output of from about 1 μW to about 1 W.

14. (Original) The thermoelectric power source of claim 1 wherein the volume of the thermoelectric power source is less than about 10 cm^3 and provides voltages of greater than about 1 volt.

15. (Original) The thermoelectric power source of claim 14 wherein the thermoelectric power source produces power at temperature differences of about 20°C or less.

16. (Original) The thermoelectric power source of claim 1 wherein two or more n-type thermoelements are positioned and electrically connected in parallel with one another and the parallel positioned n-type thermoelements are electrically connected in series to p-type thermoelements.

17. (Original) The thermoelectric power source of claim 1 wherein the n-type thermoelements are substantially free of selenium.

18. (Original) The thermoelectric power source of claim 1 wherein the flexible substrate is a polyimide.

19 – 22. (Canceled)

23. (Currently Amended) A thermoelectric power source comprising:

a flexible substrate having an upper surface;

multiple thermocouples electrically connected to one another on the upper surface of the flexible substrate, the thermocouples comprising:

sputter deposited thin film p-type thermoelements;

sputter deposited thin film n-type thermoelements alternatingly positioned adjacent the p-type thermoelements; ~~and~~

wherein the thermoelectric power source has a volume of less than about 10 cm^3 and has a power output of from about 1 μW to about 1 W; and

wherein the p-type thermoelements or the n-type thermoelements comprise a Bi_xTe_y, Sb_xTe_y, or Bi_xSe_y alloy where x is about 2 and y is about 3.

24. (Currently Amended) The thermoelectric device of claim 23 wherein said multiple thermocouples electrically connected to one another are ~~in series or~~ in series-parallel.

25. (Currently Amended) The thermoelectric power source of claim 23 wherein the p-type thermoelements have L/A ratios greater than about 20 cm^{-1} ~~have different widths as compared to the n-type thermoelements~~.

26 – 36. (Canceled)

37. (New) A thermoelectric power source comprising:

a flexible substrate having an upper surface; and

a thermoelectric couple comprising:

(a) a sputter deposited thin film p-type thermoelement positioned on the upper surface of the flexible substrate;

(b) a sputter deposited thin film n-type thermoelement positioned on the upper surface of the flexible substrate adjacent the p-type thermoelement; and

(c) an electrically conductive member positioned on the flexible substrate, and electrically connecting the first end of the p-type thermoelement with the second end of the n-type thermoelement, wherein the p-type or the n-type thermoelements comprise Bi_xTe_y where x is about 2 and y is about 3; and

(d) wherein the flexible substrate is in a coil configuration.

38. (New) The thermoelectric power source of claim 37 wherein the p-type thermoelements or the n-type thermoelements are at least about 1 mm in length and at least about 0.1 mm in width.

39. (New) The thermoelectric power source of claim 37 wherein the volume of the thermoelectric power source is less than about 10 cm^3 and has a power output of from about 1μW to about 1W.